

\*\*\*Suspended\*\*\*

Trend Study 2-10-96

Study site name: Broad Hollow Flat.

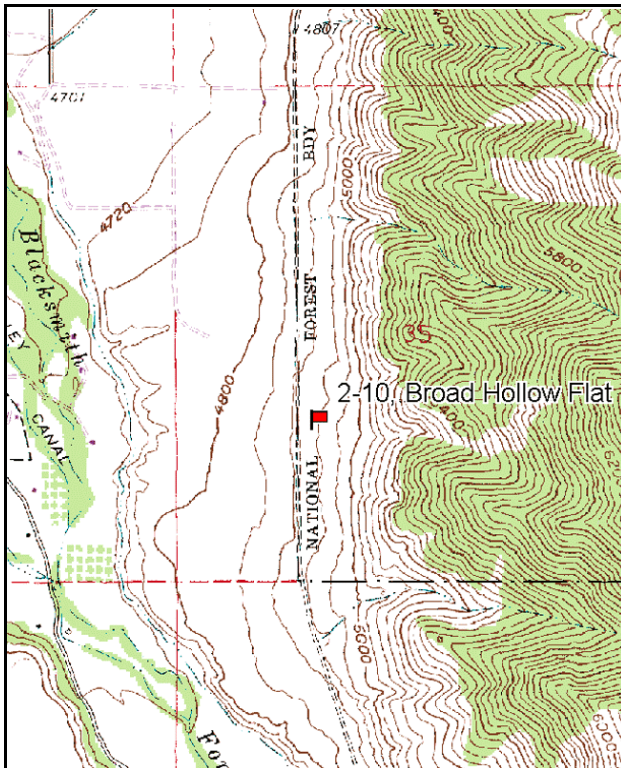
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 163 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

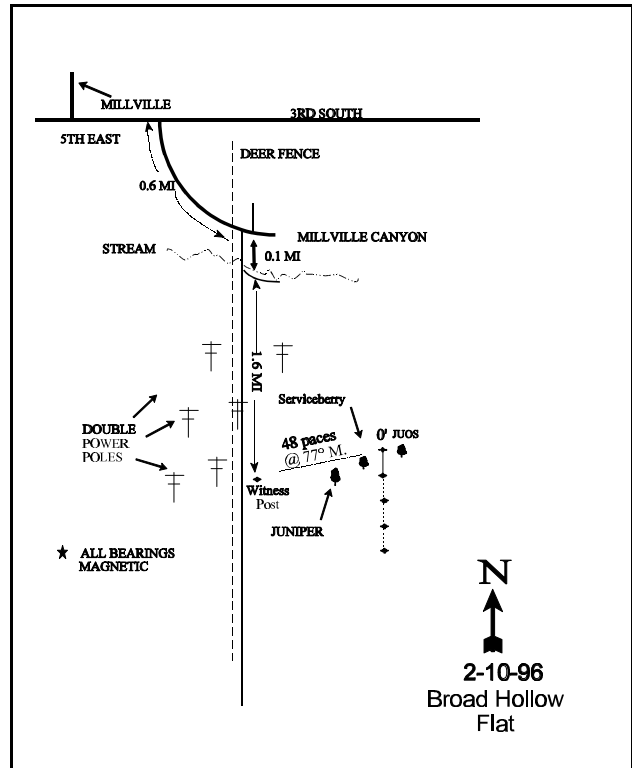
LOCATION DESCRIPTION

From 500 East and 200 South in Millville turn right (south) and proceed 0.6 miles; just beyond the deer fence turn right (south). Travel 0.1 miles (passing a small stream) and bear right at the fork. Follow the deer fence for 1.6 miles and stop at the witness post on the left. Note that the power poles cross the road and there are two sets on the right side of the road. The witness post is directly opposite the second two poles on the right. Proceed from the witness post 57 paces at 85 degrees magnetic to the 0-foot stake of the baseline marked by browse tag #7931. The baseline runs on a bearing of 163 degrees magnetic.



Map Name: Logan

Township 11N, Range 1E, Section 35



Diagrammatic Sketch

UTM 4610596 N, 432781 E

## DISCUSSION

### Trend Study No. 2-10

\*\*\***SUSPENDED** - This site was suspended in 2001 and will be reevaluated in 2006. This site was evaluated by the project leader. Abundant elk pellet groups were found, but the site is dominated by bulbous bluegrass with a few scattered, unused sagebrush and bitterbrush. Elk are being fed hay in the area during the winter by nearby landowners. This trend study is also in close proximity to two other trend study sites, Millville Canyon (2-8) and Mouth of Blacksmith Fork (2-2).

The Broad Hollow trend study samples an area slightly north of Broad Hollow on moderately steep (25%) terrain located a few hundred meters east of the big game fence on the Cache Valley face. Exposure is westerly with an elevation of approximately 4,960 feet. Topographically, terrain is level to gently sloping for 100 to 200 meters east of the fence, then becomes abruptly very steep. The level terrain is the only area that presents an opportunity for any rehabilitation of the vegetative community. The steep slopes are almost totally devoid of browse species, and they are too steep for mechanical treatment. The study area, like most of the remaining gentle terrain, has remnant populations of mountain big sagebrush and bitterbrush and a few Rocky Mountain junipers that have been highlined to a height of 7 or 8 feet. Utilization of all browse species was extremely intense during the severe winters of the early 1980's. Like most of the winter range east of the big game fence between the Logan and Blacksmith Fork rivers, this area has been seriously depleted of browse forage. Quadrat frequency of elk pellet groups was high at 41% in 1996 indicating a relatively high level of elk use. Some local people actually feed elk in the winter near the study site. Cattle pats occurred in 20% of the quadrats while deer pellet groups had a quadrat frequency of 12%.

Soil characteristics are very similar to those described in the writeup for the Mouth of Blacksmith Fork study (2-2), which is located about one mile south on the same lake terrace. The most recent soil survey names this soil as "Sterling Gravelly Loam" (Erickson and Mortensen, 1974). Soils at the site have a clay loam texture that is very compact, and restrictive to soil depth estimated to approximately 10 inches. Rooting depth is obviously not totally restrictive as evidenced by the presence of deeper rooted (14-15 inches) mountain big sagebrush. Rocks are not common on the surface, although there is a layer of rock or large gravel that occurs in the soil profile between 3 and 8 inches under the soil surface. Soil temperatures are also relatively high at 73° F with an average depth of nearly 10 inches. The soil reaction is moderately alkaline (7.8 pH). Phosphorus could be a limiting factor at only 4.9 ppm as values less than 10 ppm may limit normal plant growth and development. Protective ground cover is abundant with no accelerated erosion noticeable.

Vegetation at this site is different than at the Mouth of Blacksmith Fork trend study. Mountain big sagebrush is present but it is far less abundant and even more decadent. The site had been seeded (i.e., drilled) with crested wheatgrass prior to study establishment in 1984. The seeding treatment has been at least moderately successful and has helped control annual and perennial weeds.

The remaining browse is in extremely poor condition. It should be noted again that some local people are receiving free hay locally and feeding the elk in the winter, causing excessively high concentrations of animals and heavier than normal use on the remaining shrubs. A once numerous stand of mountain big sagebrush has been reduced to a mere 200 plants/acre. Moreover, those that remain were classified as 100% decadent in 1984 and 1990. No reproduction was apparent and browsing was so intense that almost no seed was produced. During the 1996 reading, the sample size was increased three fold. Estimated density was 220 mostly mature plants/acre. Utilization is light and vigor improved from previous readings. Percent decadence has declined to 9%. Some reproduction is evident with the appearance of seedlings and seed production noted on mature plants. Seedling establishment will have considerable competition due to an abundant herbaceous understory that is dominated by bulbous bluegrass which contributes 69% of the grass cover.

A few large serviceberry and bitterbrush plants still occur on the site. These shrubs are better equipped to deal with the browsing pressure. Furthermore, these species are longer-lived, and more resistant to use. They will likely outlast the sagebrush. Broom snakeweed, an increaser, was sampled in small numbers in 1990, but did not appear to be expanding. However, it had expanded dramatically from 266 plants/acre to 9,740 by 1996. Sixty percent of the population consists of young plants and its reproductive potential is also high at 42% (percent of seedlings to its estimated population). Age class analysis would indicate an expanding population.

Grass cover is vigorous and dense accounting for nearly 70% of the total vegetative cover. Grasses consist chiefly of crested and intermediate wheatgrass, which were seeded, with smaller amounts of bluebunch wheatgrass and Sandberg bluegrass. Undesirable annual or perennial grasses include winter rye, jointed goatgrass, and small amounts of annual brome grasses.

Forbs are less important than grasses on this site as they only contribute 22% of the herbaceous cover. They include a number of undesirable invaders and increasers. The most abundant perennial forbs include dyers woad, ragweed, yellow salsify, and curlycup gumweed. Alfalfa, although rather infrequent, is the best quality forb on the site.

#### 1984 APPARENT TREND ASSESSMENT

Soil trend appears stable. Vegetative and litter cover are both extensive and there is little runoff or erosion. A bigger problem is sedimentation from the steeper slopes to the east. Vegetative condition is poor and trend appears to be declining. Although establishment of crested wheatgrass has helped stabilize the site from a watershed point of view, it has meant little to wintering wildlife. From the data, it appears that in time, most of the remaining browse plants will be gone.

#### 1990 TREND ASSESSMENT

Sagebrush canopy cover is too low on this site to be measured by the variable plot method. Only 1 decadent sagebrush was encountered. Grasses that have increased substantially include annual rye, Sandberg bluegrass, bulbous bluegrass, and crested wheatgrass. Many undesirable forb species, especially dyers woad, gumweed, and ragweed, also appear to be increasing at the expense of more useful species. There is little deer use on this site, but elk use has been high since they began feeding them hay in the winter nearby.

##### TREND ASSESSMENT

soil - stable (3)

browse - down, there is little browse left on the site (1)

herbaceous understory - grasses are up, but the forb trend is downward, overall trend is up (5)

#### 1996 TREND ASSESSMENT

Ground cover characteristics have improved slightly since 1990 due to a major decline in percent bare ground from 23% to 5%. Since percent litter cover also declined, the decrease in bare ground comes mostly from the dramatic increase in bulbous bluegrass which has nearly doubled in nested frequency. Browse is still depleted but shows some improvement. There are only 200 mountain big sagebrush plants/acre, but vigor has improved, utilization is light, percent decadency has declined to 9%, and some mature plants are producing seed. Only future monitoring will determine if the few seedlings found this year can become established in an understory dominated by bulbous bluegrass, crested wheatgrass, intermediate wheatgrass, and winter rye. Sum of nested frequency has remained stable for grasses and increased for forbs. Sum of nested frequency for crested wheatgrass and intermediate wheatgrass increased slightly, while sum of nested frequency for bulbous

bluegrass nearly doubled. Sum of nested frequency for Sandberg bluegrass and bluebunch wheatgrass declined. Sum of nested frequency of ragweed, milkweed, curlycup gumweed, and dyers woad increased slightly as frequency for yellow salsify more than doubled. Trend for the herbaceous understory is slightly up but composition is very poor.

#### TREND ASSESSMENT

soil - up slightly (4)

browse - up slightly but depleted (4)

herbaceous understory - slightly up, but composition is poor (4)

#### HERBACEOUS TRENDS --

Herd unit 02 , Study no: 10

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	
G	<i>Aegilops cylindrica</i> (a)	<sub>a</sub> 3	<sub>a</sub> 2	<sub>b</sub> 15	1	1	7	.06
G	<i>Agropyron cristatum</i>	<sub>b</sub> 247	<sub>a</sub> 164	<sub>a</sub> 194	78	65	67	6.13
G	<i>Agropyron intermedium</i>	<sub>a</sub> 3	<sub>a</sub> 30	<sub>b</sub> 44	2	9	15	1.06
G	<i>Agropyron spicatum</i>	52	52	28	22	24	13	.75
G	<i>Aristida purpurea</i>	-	2	-	-	1	-	.03
G	<i>Bromus brizaeformis</i> (a)	-	-	11	-	-	5	.19
G	<i>Bromus japonicus</i> (a)	-	-	69	-	-	23	.91
G	<i>Bromus tectorum</i> (a)	-	-	25	-	-	11	.20
G	<i>Poa bulbosa</i>	<sub>a</sub> -	<sub>b</sub> 155	<sub>c</sub> 308	-	67	84	24.20
G	<i>Poa pratensis</i>	-	1	-	-	1	-	-
G	<i>Poa secunda</i>	<sub>a</sub> 27	<sub>b</sub> 166	<sub>a</sub> 14	14	64	7	.06
G	<i>Secale cereale</i> (a)	-	<sub>b</sub> 73	<sub>a</sub> 40	-	27	13	1.60
Total for Annual Grasses		3	75	160	1	28	59	2.98
Total for Perennial Grasses		329	570	588	116	231	186	32.25
Total for Grasses		332	645	748	117	259	245	35.23
F	<i>Achillea millefolium</i>	-	-	8	-	-	3	.04
F	<i>Agoseris glauca</i>	-	-	3	-	-	1	.00
F	<i>Alyssum alyssoides</i> (a)	-	-	34	-	-	13	.09
F	<i>Ambrosia psilostachya</i>	<sub>a</sub> 3	<sub>ab</sub> 16	<sub>b</sub> 27	1	6	9	1.11
F	<i>Artemisia ludoviciana</i>	5	11	11	3	5	5	.50
F	<i>Asclepias asperula</i>	10	9	16	6	5	6	1.27
F	<i>Aster</i> spp.	-	-	2	-	-	1	.03
F	<i>Astragalus utahensis</i>	7	6	2	3	4	1	.00
F	<i>Cirsium</i> spp.	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 11	-	-	6	.10
F	<i>Comandra pallida</i>	<sub>b</sub> 13	<sub>a</sub> -	<sub>a</sub> -	5	-	-	-
F	<i>Epilobium brachycarpum</i> (a)	-	-	3	-	-	2	.01

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	'96
F	<i>Erodium cicutarium</i> (a)	-	-	23	-	-	9	.19
F	<i>Gilia</i> spp. (a)	-	-	42	-	-	17	.18
F	<i>Grindelia squarrosa</i>	<sub>a</sub> 3	<sub>b</sub> 35	<sub>b</sub> 37	1	14	16	.99
F	<i>Hackelia patens</i>	<sub>b</sub> 21	<sub>a</sub> -	<sub>a</sub> -	12	-	-	-
F	<i>Helianthus annuus</i> (a)	-	-	41	-	-	20	.28
F	<i>Holosteum umbellatum</i> (a)	-	-	21	-	-	8	.14
F	<i>Isatis tinctoria</i>	13	13	22	7	5	9	.14
F	<i>Lactuca serriola</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 48	-	-	21	.18
F	<i>Melilotus alba</i>	-	-	3	-	-	1	.03
F	<i>Medicago sativa</i>	<sub>ab</sub> 2	<sub>a</sub> -	<sub>b</sub> 9	2	-	4	.12
F	<i>Oenothera caespitosa</i>	5	-	-	2	-	-	-
F	<i>Tragopogon dubius</i>	<sub>b</sub> 177	<sub>a</sub> 82	<sub>c</sub> 210	76	34	82	4.34
F	Unknown forb-perennial	-	3	3	-	2	2	.09
F	<i>Veronica biloba</i> (a)	-	-	1	-	-	1	.00
Total for Annual Forbs		0	0	165	0	0	70	0.90
Total for Perennial Forbs		259	175	412	118	75	167	8.97
Total for Forbs		259	175	577	118	75	237	9.88

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

#### BROWSE TRENDS --

Herd unit 02 , Study no: 10

T y p e	Species	Strip Frequency	Average Cover %
		'96	'96
B	<i>Amelanchier alnifolia</i>	1	-
B	<i>Artemisia tridentata vaseyana</i>	11	1.37
B	<i>Gutierrezia sarothrae</i>	61	4.55
Total for Browse		73	5.93

# BASIC COVER --

Herd unit 02 , Study no: 10

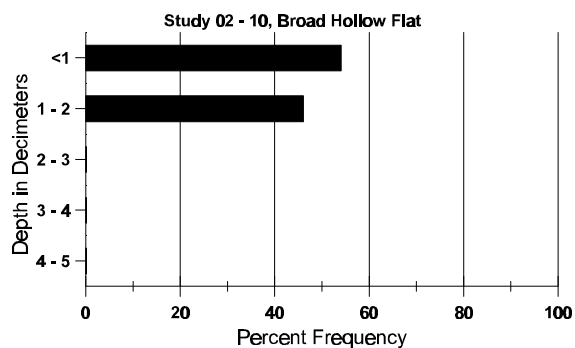
Cover Type	Nested Frequency '96	Average Cover %		
		'84	'90	'96
Vegetation	394	1.00	11.00	54.75
Rock	127	9.75	7.25	3.37
Pavement	104	7.00	6.25	2.19
Litter	396	62.50	51.50	46.81
Cryptogams	62	5.50	.75	.58
Bare Ground	201	14.25	23.25	4.56

# SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 10, Broad Hollow Flat

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.6	73.0 (9.7)	7.8	28.7	40.0	31.3	2.9	4.9	211.2	.5

# Stoniness Index



# PELLET GROUP FREQUENCY --

Herd unit 02 , Study no: 10

Type	Quadrat Frequency '96
Elk	41
Deer	12
Cattle	20

## BROWSE CHARACTERISTICS --

Herd unit 02 , Study no: 10

Field unit 02, Study no. 10																		
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier alnifolia																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	1	-	-	-	-	-	-	-	-	1	-	-	20	95	71	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)															'84	0	Dec:	-
															'90	0		-
															'96	20		-
Artemisia tridentata vaseyana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	3	-	-	-	-	-	-	-	-	-	3	-	-	60			3
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	9	1	-	-	-	-	-	-	-	-	10	-	-	200	25	31	10
D	84	-	-	6	-	-	-	-	-	-	2	-	-	4	200			6
	90	-	1	-	-	-	-	-	-	-	-	-	-	1	33			1
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			100%			67%			-84%							
'90		100%			00%			100%			+85%							
'96		09%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)															'84	200	Dec:	100%
															'90	33		100%
															'96	220		9%

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	206	-	-	-	-	-	-	-	-	206	-	-	-	4120		206	
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	96	290	-	-	-	-	-	-	-	-	290	-	-	-	5800		290	
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	90	7	-	-	-	-	-	-	-	-	7	-	-	-	233	11	7	
	96	197	-	-	-	-	-	-	-	-	197	-	-	-	3940	11	197	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%			+97%							
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	266		-			
												'96	9740		-			
Juniperus scopulorum																		
M	84	-	-	1	-	-	-	-	-	-	1	-	-	-	33	69	59	1
	90	-	-	-	1	-	-	-	-	-	1	-	-	-	33	102	67	1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			100%			00%			+ 0%							
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	33	Dec:	-			
												'90	33		-			
												'96	0		-			
Purshia tridentata																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	49	79	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	0		-			